Part of #17

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	THOMAS P. FEIST ET AL.	) Group Art Unit: 1773
Serial No.:	09/845,743	)
Filed:	May 01, 2001	) Examiner: K. Bernatz
For:	DATA STORAGE MEDIA	)

DECLARATION PURSUANT TO 37 C.F.R. § 1.132

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

I, Thomas P. Feist, declare and state:

1. My educational background includes a B.S. in Chemistry from Williams College (1985), and a Ph.D. in Materials Science and Engineering from University of Pennsylvania (1991).

2. I have been employed by the General Electric Company since 1996, where I am currently manager of the Thin Films Laboratory at GE Global Research.

3. I have worked in the field of data storage media since 1997.

4. I have read and understand U.S. Patent Application Serial No. 09/845,743 (hereinafter the "Patent Application").

5. I have read and understand U.S. Patent No. 5,538,774 to Landin et al., JP-02-096921 A (JP '921; abstract only), U.S. Patent No. 6,156,422 to Wu et al., U.S. Patent No. 6,433,964 to Chang, and U.S. Patent No. 4,911,967 to Lazzari.

6. I have read and understand the Final Rejection for the Patent Application, Paper 13, (hereinafter "Final Rejection").

7. From reading the Final Rejection, as well as being aware of the related cases and the rejections therein, it appears that there is confusion regarding the state of the art in the area of storage media as well as the progression of the storage media technology. It is my understanding that inventiveness is determined at the time of the invention and not in hindsight. At the time of the present invention, an artisan would not have known about or been able to produce storage media as claimed in the present application based upon the teachings of Landin et al., JP '921, Wu et al., Chang, and/or Lazzari.

8. The following is a summary of the history of storage media. It should be understood that this area of technology is crowded, very active, and very inventive. As is well known, in the early 1980s, most people worked on terminals connected to very large mainframe computers that stored all of the data. These mainframe computers ("main frames") were the size of small rooms. By the end of the 1980s, many people, particularly college students and businesses, owned and worked on personal computers where data was stored locally, in computers the size of boxes that readily fit beneath a desk, and/or on floppy disks (i.e., a media that required a solid plastic housing due to its highly flexible nature). These floppy disks were capable of storing a maximum of less than 1 megabyte (MB) of data. The next advance in the technology was the advent of the smaller floppy disk that stored more data (i.e., 1.44 MB of data). Although there is

always a desire to store more data in a smaller space, the design and properties of the smaller floppy disk was not obvious in view of the original floppy disk.

More storage and speed was needed from the floppy disks, but was not attainable so the industry turned to hard disks. These disks stored more data but were very large (e.g., up to half a meter in diameter) and not readily available to the general public. Around the early 1990s the hard disks became more available to the general public as the price and size decreased. Throughout the 1990s, industry continued to drive toward smaller, faster, cheaper, higher capacity hard disks. Hard disk drives became common in home computers as well as in personal computers used in businesses. Eventually the limiting factor for these hard disks, however, became the physical capability of putting additional data thereon. New recording head and magnetic thin film technology has resulted in continual increases in data density, but the rate of increase has slowed. That is, the newer disks were reaching technological limits of data density (bits per square inch), and in fact are approaching the "super-parametric limit" where additional data could not be disposed onto the disk without the potential for spontaneous loss of data due to demagnetization. The technology had to take another turn or it would not advance.

9. The present Patent Application teaches and claims the next advance in the technology where the substrate for the storage media comprises at least one plastic portion, an edge lift height of less than about 8 μ, a surface roughness of less than about 10Å, and an axial displacement peak of less than about 500 μ under shock or vibration excitation. The present application additionally teaches the effects and desired modal frequencies, tilt, surface features, moment of inertia, and other factors that enable

additional data storage that was not previously available for storage media as claimed in the present application.

10. Applicants have discovered a way to increase the capacity of data storage media beyond that previously available. Applicants note that their application claims the benefit of filing dates in 1999. The technology has further advanced since 1999, e.g., individuals can purchase hard disks with up to about 200 Gigabytes (GB) of data storage for a few hundred dollars whereas in 1999 such media was not even available. These technological advances illustrated by the marketplace, however, do not render the present invention obvious. Actually, they support the position that advances were non-obvious and greatly desired. There has been great commercial success in this area, and the market for higher capacity media is growing exponentially.

11. The limitations taught and claimed in the Present Application were not obvious to artisans at the time of the Present Application. Granted, a desire to improve capacity existed, and continues to exist. Avenues and processes that enable such improvement did not exist. In fact, there were several articles written about the need to find a new way to achieve higher density media and "beat" the superparamagnetic limit. Researchers have postulated various means of achieving this, such as Heat Assisted Magnetic Recording, but none have been able to demonstrate a way to achieve it. In other words, an unfulfilled need existed in the industry that is met by the present invention. A mere desire to have an improved product does not render the improvement obvious. If all of these improvements were so obvious, the market for this technology would not be dominated by a handful of high technology companies; it would be flooded

by individuals looking to jump on the bandwagon. This field is not an area where all technological advances have already been made. It is an area where highly skilled and educated people are racing to reduce costs, decrease media size, and increase data retrieval speeds in order to give their company a competitive advantage in the marketplace.

12. With respect to the particular references cited in the Final Rejection, these references do not render the claimed invention obvious. For example, Chang is directed to floppy disks. It is not obvious or even logical to think that a floppy disk has an edge lift height of less than about 8 μ, a surface roughness of less than about 10Å, and an axial displacement peak of less than about 500 μ under shock or vibration excitation, for example. By its very nature, a floppy disk is flexible; i.e., *floppy*. It would not and does not need to meet the limitations of the claims of the Present Application and it is not possible to "optimize" it to meet such limitations without wholly discarding it and replacing it with the media taught in the present application.

13. With respect to Landin et al., JP '921 (abstract only), Lazzari, and Wu et al., the Examiner seems to recognize that the claimed limitations in the Present Application are not inherent, i.e., are not necessarily present: "in the instance that the claimed property limitations would not necessarily have been present... it would have been obvious to one having ordinary skill in the art to have minimized the cause effective variables...". It is correct that the claimed elements of the Present Application are not necessarily present in these references. The limitations set forth in the references can readily be attained without meeting the limitations of the claims of the Present

Application. In other words, thru testing, experiments, and/or modeling performed during the development of the claimed media, disks having the parameters described in these references were reviewed for their properties. These disks failed to meet the claimed limitations.

14. In hindsight (i.e., with the teaching and knowledge imparted by the Present Application), Landin et al., JP '921 (abstract only), Lazzari, and Wu et al. can be altered to meet the teachings of the Present Application. However, there is no teaching or motivation in these references to any such modification and the claimed limitations do not necessarily flow from the references' teachings. There is no enablement in these applications on how to meet the claim limitations or mention of their existence or importance. At a minimum, none of these references even mention: edge lift, moment of inertia, tilt (radial or tangential), moisture content, specific gravity, or modal frequency. These are variables identified and claimed in the Present Application. They are non-obvious and not mere optimizations.

15. Many characteristics, and in particular the combination of characteristics, set forth in the Patent Application are not identified or addressed in any of Landin et al., JP '921 (abstract only), Lazzari, and Wu et al.. Recitation of multiple references that all fail to teach the claimed ranges and even to identify the claimed properties is evidence of the non-obviousness of the present claims' and the advance that applicants have provided to the field of storage media. The Patent Application identifies a unique product that meets certain characteristics, thereby allowing it to attain high capacity while being mass producible.

16. I further declare that all statements and representations made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and representations were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

Sept. 26, 2003

Dated

T. P. F

Thomas P. Feist